DYNAUDIO
Professional

Air Series - Placement & Calibration

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Placement & Calibration Test files for the Air Series

Full performance from your speakers is assured only if the speakers are correctly placed and calibrated. This Test-CD is for testing these conditions and specifically for the Dynaudio Air speaker systems.

If you are interested in more information on the Dynaudio Air speakers or if you need more detailed information on placing speakers plus additional background information, please feel free to download the full manual from the www.dynaudioacoustics.com website.

Phase Checking

First procedure to be carried out is phase checking.
A number of signals both for two-channel stereo and for multi channel reproduction are provided with the CD.

Two channel stereo:
Use tracks 45 to 49 on CD. 1 L/R signals are presented in phase and subsequently out of phase.

Multichannel:
Use the tracks 45 to 64 on CD 2 which contain DTS encoded signals pair-wise comparable:
L/R, L/C, L/LS, R/RS.

Checking by ear when listening to the signals:
In phase:
You will hear more bass and the sound coming from a fixed point between the speakers.

Out of phase:
You will hear the sound image lose bass, the sound image is diffuse, and the directional information is blurred.

NB: If you already have a phase checking measurement system that can be used as well.

Checking the Placing

When checking the placement of the speakers you first of all have to focus on the low frequencies. So the signals to be used are the low frequency sweeps that you find on the CD from tracks 31 to 39.

Low-frequency Sweeps

The tracks 31 to 39 contain the following sweep sequences.

Track 31:	200 Hz	–	20 Hz
Track 32:	160 Hz	–	20 Hz
Track 33:	125 Hz	–	20 Hz
Track 34:	100 Hz	–	20 Hz
Track 35:	80 Hz	–	20 Hz
Track 36:	63 Hz	–	20 Hz
Track 37:	50 Hz	–	20 Hz
Track 38:	40 Hz	–	20 Hz
Track 39:	32 Hz	–	20 Hz

During the sweeps you will hear short “beebs” telling when the signal passes one of the ISO center frequencies. There are two beebs every time the frequency passes a whole octave center frequency and one beep every time the in-between 1/3-octave center frequencies are passed. Play all the tracks using only one speaker at a time.

Equalizing

The AIR system offers a two-band shelving type equalizer. This can be used individually on each speaker, and it is implemented for a fine adjustment of the tonal balance.

Range: ±6 dB
Adjustment step: 0.5 dB
Band I: 100 Hz - 1 kHz
Band II: 1 kHz - 5 kHz
Filter type: Shelving

You should be very careful using this tool if you are doing the adjustment by ear. In a room with good acoustics, equalizing should not be necessary at all.
As a test signal you can use full bandwidth pink noise (track 2 or 13) on the test-CD.
In a room that you feel heavily over damped at higher frequencies you may wish to ad some level in the high end in order to get the right balance. Do it with care then.
In a highly reflective room you may wish to attenuate the high frequencies. If you have made a good job placing the speaker in a proper position you should not touch the low frequency band.

Additional equalizing on Air speakers can be done via the optional Installer’s Software.

Evaluation

Hear a smooth and even signal throughout all frequency sweeps (bearing in mind that the frequency response of the ear is not flat).

If you have a sound level meter this should be set to “LIN” (no frequency weighting). If the meter does not have a LIN position you can use the C-weighting, though the response is attenuated approximately 3 dB at 31.5 Hz and approximately 6 dB at 20 Hz.

In the background reading in the Air manual you can find instructions on how alternatively to use a studio microphone if you do not have a sound level meter.

If OK continue to next chapter: Calibrating the speaker setup. If not OK you must find new positions for the speakers.

Calibration Procedure

The calibration has to be made to ensure that all speakers produce the same sound pressure level in the listening position when fed with the same signal. The level of the input signal can be locked to a specific sound pressure produced by the speakers.

Inter-channel calibration In the main menu:

- Select Setup menu
- Then select Calibrate speaker
- Select speaker Master L front
  Now you can read the settings of this speaker.
- Set the Calib to 0.0 dB
- Start the CD and play track 12 or 23
  (two channel stereo)
  The tracks contain 500 Hz – 2 kHz filtered Pink Noise.

Now: The sound pressure level is measured or registered by ear.
Continue to the next channel. Using the Calib adjust to the same level as the first speaker. If using a multi channel set up continue to the next speakers.

Acoustic level calibration

In some parts of the audio industry the monitoring system has to be related to absolute acoustic levels. On the CD, the tracks mentioned above are recorded at –20 dBFS*. This level correspond to different acoustic levels depending on the kind of business you are in:

Film	Video	Music
83 dB(C)*	78 dB(C)*	78-93 dB(C)*

- Select the first speaker (L).
- Play track 12 or 23 and “solo out” this speaker
- Set Calib to 0.0 dB.
- Adjust the volume until the desired C-weighted level is obtained on a sound level meter in the listening position.
- Go on to the next speaker
- Adjust Calib till the same C-weighted level is obtained from this speaker.
- Continue the procedure until all speakers are calibrated.
- Exit calibration.

Placing the Subwoofer

Low frequency sweeps
The tracks 31 to 39 contains the following sweep sequences

Track 31:	200 Hz	–	20 Hz
Track 32:	160 Hz	–	20 Hz
Track 33:	125 Hz	–	20 Hz
Track 34:	100 Hz	–	20 Hz
Track 35:	80 Hz	–	20 Hz
Track 36:	63 Hz	–	20 Hz
Track 37:	50 Hz	–	20 Hz
Track 38:	40 Hz	–	20 Hz
Track 39:	32 Hz	–	20 Hz

During the sweeps you will hear short beep telling when the signal passes one of the ISO center frequencies. There are two beeps every time the frequency passes a whole octave center frequency and one beep every time the in-between 1/3-octave center frequencies are passed.
Play all the tracks using only the subwoofer.

Calibrating the Subwoofer

Set Bass Management on and set the volume to a reasonable level (first item in main menu) ex -30 dB.

Select Bass Management in the main menu. If no other preferences for a crossover frequency, select 80 Hz. If measurements or listening to the main speakers have indicated uneven level distribution or uneven frequency response at frequencies above 80 Hz, a higher crossover frequency should be selected.

Checking the cross-point

In order to confirm the selected crossover frequency, the CD is used. To be sure to listen to one speaker channel at a time one of the main channels are selected in the Setup menu/Calibrate speaker menu. For a start Master Left can be selected.
Playback the CD track containing the low frequency sweeps (tracks 31 to 42). Listen to the response or perform sound level measurement if you have a meter connected.
If you are in the possession of a spectrum analyzer you can instead play the CD-tracks containing full bandwidth pink noise.
Any uneven frequency response across the crossover frequency should be avoided.
You can change the level of the subwoofer via the Calibrate Speaker menu (see page 8)
You may go back to the setting of the crossover frequency in the bass management setup and select another frequency if appropriate.
After doing the adjustment on one channel, the other channels should be monitored one by on and finally all channels at one time. Now your system is calibrated.

Bass Management

Bass management (sometimes called bass redirection) is a very important feature - and it is in general an absolute necessity if you want to make a 5-channel set-up in a small room! There are several reasons for this.

The bass management system is designed to subtract the bass contents of all main channels and reproduce this by the use of a subwoofer. The AIR-series provides a number of possible.

* Level definitions

$$Level_{dBFS,RMS} = 20\ \log_{10}\ \sqrt{\frac{1}{N_{samples}} \sum_{n=1}^{N_{samples}} x_n^{\,2}}$$

The level readings given in the CD track tables are based on the direct mathematical definition of Root-Mean-Square, converted to dB:

By this definition, a digital signal with clipping at +/- 1.0 can never exceed 0 dBFS RMS. However, the AES17 standard uses a full-scale sine wave as the definition of its 0 dBFS point. This adds 3.01 dB to the mathematical value as defined above, so that a full-scale square wave will read +3.01 dBFS. Therefore, please add 3.01 dB to the table readings for AES17 compatibility. We chose not to do so for you, lest you'd think the CD contents had changed since the last revision. It has not.

We apologize for any confusion caused by this discrepancy.

cross-over frequencies that can be selected by the user.

Checking summing phase cancellation

In a basic 2-channel set-up or 5-channel set-up (like the ITU-775) a sub-woofer is not specified and is not required. But making audio production to be played back on consumer equipment, one has to ensure that the mix will sound right in this situation. Many consumer setups provide a subwoofer. Hence it is very important to check what the summing of the bass is like. If the program material basically is out of phase, the bass will be cancelled when summed electrically. But this is not the case if the bass signals are reproduced by the main speakers and summed acoustically. A dramatic difference may exist!

Controlling standing waves

It can be very difficult to get two loudspeakers in the right position in order to prevent the excitation of the standing waves. But placing five loudspeakers are even more difficult! Each loudspeaker should play under the same conditions as the others but that is seldom possible.

Three front speakers can normally be placed away from disturbing boundaries to reduce the excitation of the standing waves. But in small rooms the rear speakers very often are placed in a corner or on a wall. Having the full frequency range reproduced in a loudspeaker like that, there may occur serious problems which result in a poor low frequency sound distribution in the room.

So this is another reason for using bass management. Simply: Only one loudspeaker - the subwoofer - has to be placed in a safe position. The cross over frequency can be selected to a value just above the problematic frequency range.

Three other parameters to consider in relation to the subwoofer:

LFE Low Pass Filter

Range: On/Off (default off)
It is generally advisable to feed only effects to the LFE channel as opposed to combining the LFE signal with musical content extracted from the main speakers. However, as this is not necessarily the case with the material you are monitoring, the LFE Low Pass Filter (Brickwall Limiter) attenuating frequencies above 120Hz, can be used to examine how the material will survive the band limiting in some encoder-decoder systems .

Polarity

Range: 0-180°
If the Subwoofer is correctly placed, setting the Phase Reverse parameter at 180° should result in a full Phase cancellation at the set Cross -over frequency. If this is not the case - the Delay parameter should be adjusted.

Delay

Range: 0-1800mm
If you via the "phase-reverse test" described above found that the sub is not correctly placed you should use the Delay parameter to compensate.

Multichannel Part DTS Encoded

	Track Index Name	Level* dBFS RMS	Channels	Correlation 0/1	On time sec	Off time sec	N repeats sec	Duration sec
Broadband noise								
1	Channel ID (L,C,R,Rs,Ls,LFE)	-20	all	N.A.	12	0	1	12
2	Uncorrelated Pink Noise	-20	all	0	20	0	1	20
3	Ditto HP 32 Hz	-20.4309	all	0	20	0	1	20
4	Ditto HP 40 Hz	-20.5809	all	0	20	0	1	20
5	Ditto HP 50 Hz	-20.7363	all	0	20	0	1	20
6	Ditto HP 63 Hz	-20.903	all	0	20	0	1	20
7	Ditto HP 80 Hz	-21.0808	all	0	20	0	1	20
8	Ditto HP 100 Hz	-21.2542	all	0	20	0	1	20
9	Ditto HP 125 Hz	-21.4363	all	0	20	0	1	20
10	Ditto HP 160 Hz	-21.6468	all	0	20	0	1	20
11	Ditto HP 200 Hz	-21.8452	all	0	20	0	1	20
12	Ditto BP 500/2000 Hz	-20	all	0	20	0	1	20
13	Correlated Pink Noise	-20	all	1	20	0	1	20
14	Ditto HP 32 Hz	-20.4422	all	1	20	0	1	20
15	Ditto HP 40 Hz	-20.5886	all	1	20	0	1	20
16	Ditto HP 50 Hz	-20.7408	all	1	20	0	1	20
17	Ditto HP 63 Hz	-20.9075	all	1	20	0	1	20
18	Ditto HP 80 Hz	-21.0868	all	1	20	0	1	20
19	Ditto HP 100 Hz	-21.258	all	1	20	0	1	20
20	Ditto HP 125 Hz	-21.4384	all	1	20	0	1	20
21	Ditto HP 160 Hz	-21.6494	all	1	20	0	1	20
22	Ditto HP 200 Hz	-21.85	all	1	20	0	1	20
23	Ditto BP 500/2000 Hz	-20	all	1	20	0	1	20
24	Pulsed correlated P.N.	-12	all	1	2	5	5	35
25	Pulsed uncorrelated P.N.	-12	all	0	2	5	5	35
26	Pulsed correlated P.N. 50-20000 Hz	-12	all	1	0.02	0.98	10	10
27	Pulsed uncorrelated P.N. 50-20000 Hz	-12	all	0	0.02	0.98	10	10
28	Pulsed correlated P.N. 20-20000 Hz	-12	all	1	0.05	0.95	10	10
29	Pulsed uncorrelated P.N. 20-20000 Hz	-12	all	0	0.05	0.95	10	10
Sweeps								
30	Sweep 20 Hz - 20 kHz	-20	all	1	50	0	1	50
31	Sweep 200-20 Hz *	-12	all	1	20	0	1	20
32	Sweep 160-20 Hz *	-12	all	1	18	0	1	18
33	Sweep 125-20 Hz *	-12	all	1	16	0	1	16
34	Sweep 100-20 Hz *	-12	all	1	14	0	1	14
35	Sweep 80-20 Hz *	-12	all	1	12	0	1	12
36	Sweep 63-20 Hz *	-12	all	1	10	0	1	10
37	Sweep 50-20 Hz *	-12	all	1	8	0	1	8
38	Sweep 40-20 Hz *	-12	all	1	6	0	1	6
39	Sweep 32-20 Hz *	-12	all	1	4	0	1	4
40	MultiSweep 50-125 Hz *	-12	all	1	13.3	0	4	53.2
41	MultiSweep 63-160 Hz *	-12	all	1	13.3	0	4	53.2
42	MultiSweep 80-200 Hz *	-12	all	1	13.3	0	4	53.2
43	1/3 oct pink noise sweep 20 Hz - 20 kHz	-20	all	0	50	0	1	50
44	1/3 oct pink noise sweep 20 Hz - 20 kHz	-20	all	1	50	0	1	50
Phase Check								
45	Pink noise In / Out of / In phase	-20	L/R	n.a.	15	0	1	15
46	Pink noise In / Out of / In phase	-20	L/C	n.a.	15	0	1	15
47	Pink noise In / Out of / In phase	-20	L/LS	n.a.	15	0	1	15
48	Pink noise In / Out of / In phase	-20	R/RS	n.a.	15	0	1	15
49	Ditto, bandlimited 20-200 Hz	-20	L/R	n.a.	15	0	1	15
50	“	-20	L/C	n.a.	15	0	1	15
51	“	-20	L/LS	n.a.	15	0	1	15
52	“	-20	R/RS	n.a.	15	0	1	15
53	Ditto, bandlimited 200-2000 Hz	-20	L/R	n.a.	15	0	1	15
54	“	-20	L/C	n.a.	15	0	1	15
55	“	-20	L/LS	n.a.	15	0	1	15
56	“	-20	R/RS	n.a.	15	0	1	15
57	Ditto, bandlimited 2-5 kHz	-20	L/R	n.a.	15	0	1	15
58	“	-20	L/C	n.a.	15	0	1	15
59	“	-20	L/LS	n.a.	15	0	1	15

Track	Index	Name	Level* dBFS RMS	Channels	Correlation 0/1	On time sec	Off time sec	N repeats sec	Duration sec
60		"	-20	R/RS	n.a.	15	0	1	15
61		Ditto, bandlimited 5-22 kHz	-20	L/R	n.a.	15	0	1	15
62		"	-20	L/C	n.a.	15	0	1	15
63		"	-20	L/LS	n.a.	15	0	1	15
64		"	-20	R/RS	n.a.	15	0	1	15
Power bursts/sweeps (room reverb, rattle/buzz)									
65									
1		1/1 oct Pink Noise 8 kHz	-12	all	0	2	2	1	4
2		1/1 oct Pink Noise 4 kHz	-12	all	0	2	2	1	4
3		1/1 oct Pink Noise 2 kHz	-12	all	0	2	2	1	4
4		1/1 oct Pink Noise 1 kHz	-12	all	0	2	2	1	4
5		1/1 oct Pink Noise 500 Hz	-12	all	0	2	2	1	4
6		1/1 oct Pink Noise 250 Hz	-12	all	0	2	2	1	4
7		1/1 oct Pink Noise 125 Hz	-12	all	0	2	2	1	4
8		1/1 oct Pink Noise 63 Hz	-12	all	0	2	2	1	4
66									
1		1/3 oct Pink Noise 16 kHz	-12	all	0	2	2	1	4
2		1/3 oct Pink Noise 12.5 kHz	-12	all	0	2	2	1	
3		1/3 oct Pink Noise 10 kHz	-12	all	0	2	2	1	4
4		1/3 oct Pink Noise 8 kHz	-12	all	0	2	2	1	4
5		1/3 oct Pink Noise 6.3 kHz	-12	all	0	2	2	1	4
6		1/3 oct Pink Noise 5 kHz	-12	all	0	2	2	1	4
7		1/3 oct Pink Noise 4 kHz	-12	all	0	2	2	1	4
8		1/3 oct Pink Noise 3.15 kHz	-12	all	0	2	2	1	4
9		1/3 oct Pink Noise 2.5 kHz	-12	all	0	2	2	1	4
10		1/3 oct Pink Noise 2 kHz	-12	all	0	2	2	1	4
11		1/3 oct Pink Noise 1.6 kHz	-12	all	0	2	2	1	4
12		1/3 oct Pink Noise 1.25 kHz	-12	all	0	2	2	1	4
13		1/3 oct Pink Noise 1 kHz	-12	all	0	2	2	1	4
14		1/3 oct Pink Noise 800 Hz	-12	all	0	2	2	1	4
15		1/3 oct Pink Noise 630 Hz	-12	all	0	2	2	1	4
16		1/3 oct Pink Noise 500 Hz	-12	all	0	2	2	1	4
17		1/3 oct Pink Noise 400 Hz	-12	all	0	2	2	1	4
18		1/3 oct Pink Noise 315Hz	-12	all	0	2	2	1	4
19		1/3 oct Pink Noise 250 Hz	-12	all	0	2	2	1	4
20		1/3 oct Pink Noise 200 Hz	-12	all	0	2	2	1	4
21		1/3 oct Pink Noise 160 Hz	-12	all	0	2	2	1	4
22		1/3 oct Pink Noise 125Hz	-12	all	0	2	2	1	4
23		1/3 oct Pink Noise 100 Hz	-12	all	0	2	2	1	4
24		1/3 oct Pink Noise 80 Hz	-12	all	0	2	2	1	4
25		1/3 oct Pink Noise 63 Hz	-12	all	0	2	2	1	4
26		1/3 oct Pink Noise 50 Hz	-12	all	0	2	2	1	4
27		1/3 oct Pink Noise 40 Hz	-12	all	0	2	2	1	4
28		1/3 oct Pink Noise 31.5Hz	-12	all	0	2	2	1	4
29		1/3 oct Pink Noise 25 Hz	-12	all	0	2	2	1	4
30		1/3 oct Pink Noise 20 Hz	-12	all	0	2	2	1	4
67		+ Pink Gaussian Pulses, BW 25 Hz	FS	all	1	0.1	0.9	10	10
68		+Pink Gaussian Pulses, BW 50 Hz	FS	all	1	0.05	0.95	10	10
69		+Pink Gaussian Pulses, BW 100 Hz	FS	all	1	0.025	0.975	10	10
70		+Pink Gaussian Pulses, BW 200 Hz	FS	all	1	0.0125	0.9875	10	10
71		+Pink Gaussian Pulses, BW 400 Hz	FS	all	1	0.00675	0.99325	10	10
72		-Pink Gaussian Pulses, BW 25 Hz	FS	all	1	0.1	0.9	10	10
73		-Pink Gaussian Pulses, BW 50 Hz	FS	all	1	0.05	0.95	10	10
74		-Pink Gaussian Pulses, BW 100 Hz	FS	all	1	0.025	0.975	10	10
75		-Pink Gaussian Pulses, BW 200 Hz	FS	all	1	0.0125	0.9875	10	10
76		-Pink Gaussian Pulses, BW 400 Hz	FS	all	1	0.00675	0.99325	10	10
77		PowerSweep 315-20 Hz *	-4	all	1	18.3	0	1	18.3
78		Warbled Power Sweep 315-20 Hz *	-4	all	1	18.3	0	1	18.3
79		Pink Noise 1/3 Oct sweep 315-20 Hz *	-12	all	1	18.3	0	1	18.3
80		Tone Bursts 315 Hz - 20 Hz	-3 (=FS)	all	1	1	4	13	65
81		Tone Bursts 315 Hz - 20 kHz	-3 (=FS)	all	1	0.5	2.5	19	57
82		Abs. Phase Checker	FS	all	1	0.2	0	300	60
83-94		Like 31-42 but with LFE							267.6
Total net duration [minutes]									33.935

Stereo Part

Track Index	Name	Level* dBFS RMS	Channels	Correlation 0/1	On time sec	Off time sec	N repeats sec	Duration sec
Broadband noise								
1	Channel ID (L,R)	-20	all	N.A.	12	0	1	12
2	Uncorrelated Pink Noise	-20	all	0	20	0	1	20
3	Ditto HP 32 Hz	-20.4273	all	0	20	0	1	20
4	Ditto HP 40 Hz	-20.5742	all	0	20	0	1	20
5	Ditto HP 50 Hz	-20.7293	all	0	20	0	1	20
6	Ditto HP 63 Hz	-20.8982	all	0	20	0	1	20
7	Ditto HP 80 Hz	-21.0787	all	0	20	0	1	20
8	Ditto HP 100 Hz	-21.2511	all	0	20	0	1	20
9	Ditto HP 125 Hz	-21.4325	all	0	20	0	1	20
10	Ditto HP 160 Hz	-21.645	all	0	20	0	1	20
11	Ditto HP 200 Hz	-21.847	all	0	20	0	1	20
12	Ditto BP 500/2000 Hz	-20	all	0	20	0	1	20
13	Correlated Pink Noise	-20	all	1	20	0	1	20
14	Ditto HP 32 Hz	-20.4422	all	1	20	0	1	20
15	Ditto HP 40 Hz	-20.5886	all	1	20	0	1	20
16	Ditto HP 50 Hz	-20.7408	all	1	20	0	1	20
17	Ditto HP 63 Hz	-20.9075	all	1	20	0	1	20
18	Ditto HP 80 Hz	-21.0868	all	1	20	0	1	20
19	Ditto HP 100 Hz	-21.258	all	1	20	0	1	20
20	Ditto HP 125 Hz	-21.4384	all	1	20	0	1	20
21	Ditto HP 160 Hz	-21.6494	all	1	20	0	1	20
22	Ditto HP 200 Hz	-21.85	all	1	20	0	1	20
23	Ditto BP 500/2000 Hz	-20	all	1	20	0	1	20
24	Pulsed correlated P.N.	-12	all	1	2	5	5	35
25	Pulsed uncorrelated P.N.	-12	all	0	2	5	5	35
26	Pulsed correlated P.N. 50-20000 Hz	-12	all	1	0.02	0.98	10	10
27	Pulsed uncorrelated P.N. 50-20000 Hz	-12	all	0	0.02	0.98	10	10
28	Pulsed correlated P.N. 20-20000 Hz	-12	all	1	0.05	0.95	10	10
29	Pulsed uncorrelated P.N. 20-20000 Hz	-12	all	0	0.05	0.95	10	10
Sweeps								
30	Sweep 20 Hz - 20 kHz	-20	all	1	50	0	1	50
31	Sweep 200-20 Hz *	-12	all	1	20	0	1	20
32	Sweep 160-20 Hz *	-12	all	1	18	0	1	18
33	Sweep 125-20 Hz *	-12	all	1	16	0	1	16
34	Sweep 100-20 Hz *	-12	all	1	14	0	1	14
35	Sweep 80-20 Hz *	-12	all	1	12	0	1	12
36	Sweep 63-20 Hz *	-12	all	1	10	0	1	10
37	Sweep 50-20 Hz *	-12	all	1	8	0	1	8
38	Sweep 40-20 Hz *	-12	all	1	6	0	1	6
39	Sweep 32-20 Hz *	-12	all	1	4	0	1	4
40	MultiSweep 50-125 Hz *	-12	all	1	13.3	0	4	53.2
41	MultiSweep 63-160 Hz *	-12	all	1	13.3	0	4	53.2
42	MultiSweep 80-200 Hz *	-12	all	1	13.3	0	4	53.2
43	1/3 oct pink noise sweep 20 Hz - 20 kHz	-20	all	0	50	0	1	50
44	1/3 oct pink noise sweep 20 Hz - 20 kHz	-20	all	1	50	0	1	50
Phase Check								
45	Pink noise In / Out of / In phase	-20	L/R	n.a.	15	0	1	15
46	Ditto, bandlimited 20-200 Hz	-20	L/R	n.a.	15	0	1	15
47	Ditto, bandlimited 200-2000 Hz	-20	L/R	n.a.	15	0	1	15
48	Ditto, bandlimited 2-5 kHz	-20	L/R	n.a.	15	0	1	15
49	Ditto, bandlimited 5-22 kHz	-20	L/R	n.a.	15	0	1	15

Stereo Part

Track Index	Name	Level* dBFS RMS	Channels	Correlation 0/1	On time sec	Off time sec	N repeats sec	Duration sec
Broadband noise								
1	1/1 oct Pink Noise 8 kHz	-12	all	0	2	2	1	4
2	1/1 oct Pink Noise 4 kHz	-12	all	0	2	2	1	4
3	1/1 oct Pink Noise 2 kHz	-12	all	0	2	2	1	4
4	1/1 oct Pink Noise 1 kHz	-12	all	0	2	2	1	4
5	1/1 oct Pink Noise 500 Hz	-12	all	0	2	2	1	4
6	1/1 oct Pink Noise 250 Hz	-12	all	0	2	2	1	4
7	1/1 oct Pink Noise 125 Hz	-12	all	0	2	2	1	4
8	1/1 oct Pink Noise 63 Hz	-12	all	0	2	2	1	4
51								
1	1/3 oct Pink Noise 16 kHz	-12	all	0	2	2	1	4
2	1/3 oct Pink Noise 12.5 kHz	-12	all	0	2	2	1	4
3	1/3 oct Pink Noise 10 kHz	-12	all	0	2	2	1	4
4	1/3 oct Pink Noise 8 kHz	-12	all	0	2	2	1	4
5	1/3 oct Pink Noise 6.3 kHz	-12	all	0	2	2	1	4
6	1/3 oct Pink Noise 5 kHz	-12	all	0	2	2	1	4
7	1/3 oct Pink Noise 4 kHz	-12	all	0	2	2	1	4
8	1/3 oct Pink Noise 3.15 kHz	-12	all	0	2	2	1	4
9	1/3 oct Pink Noise 2.5 kHz	-12	all	0	2	2	1	4
10	1/3 oct Pink Noise 2 kHz	-12	all	0	2	2	1	4
11	1/3 oct Pink Noise 1.6 kHz	-12	all	0	2	2	1	4
12	1/3 oct Pink Noise 1.25 kHz	-12	all	0	2	2	1	4
13	1/3 oct Pink Noise 1 kHz	-12	all	0	2	2	1	4
14	1/3 oct Pink Noise 800 Hz	-12	all	0	2	2	1	4
15	1/3 oct Pink Noise 630 Hz	-12	all	0	2	2	1	4
16	1/3 oct Pink Noise 500 Hz	-12	all	0	2	2	1	4
17	1/3 oct Pink Noise 400 Hz	-12	all	0	2	2	1	4
18	1/3 oct Pink Noise 315Hz	-12	all	0	2	2	1	4
19	1/3 oct Pink Noise 250 Hz	-12	all	0	2	2	1	4
20	1/3 oct Pink Noise 200 Hz	-12	all	0	2	2	1	4
21	1/3 oct Pink Noise 160 Hz	-12	all	0	2	2	1	4
22	1/3 oct Pink Noise 125Hz	-12	all	0	2	2	1	4
23	1/3 oct Pink Noise 100 Hz	-12	all	0	2	2	1	4
24	1/3 oct Pink Noise 80 Hz	-12	all	0	2	2	1	4
25	1/3 oct Pink Noise 63 Hz	-12	all	0	2	2	1	4
26	1/3 oct Pink Noise 50 Hz	-12	all	0	2	2	1	4
27	1/3 oct Pink Noise 40 Hz	-12	all	0	2	2	1	4
28	1/3 oct Pink Noise 31.5Hz	-12	all	0	2	2	1	4
29	1/3 oct Pink Noise 25 Hz	-12	all	0	2	2	1	4
30	1/3 oct Pink Noise 20 Hz	-12	all	0	2	2	1	4
52	+Pink Gaussian Pulses, BW 25 Hz	FS	all	1	0.1	0.9	10	10
53	+Pink Gaussian Pulses, BW 50 Hz	FS	all	1	0.05	0.95	10	10
54	+Pink Gaussian Pulses, BW 100 Hz	FS	all	1	0.025	0.975	10	10
55	+Pink Gaussian Pulses, BW 200 Hz	FS	all	1	0.0125	0.9875	10	10
56	+Pink Gaussian Pulses, BW 400 Hz	FS	all	1	0.00675	0.99325	10	10
57	-Pink Gaussian Pulses, BW 25 Hz	FS	all	1	0.1	0.9	10	10
58	-Pink Gaussian Pulses, BW 50 Hz	FS	all	1	0.05	0.95	10	10
59	-Pink Gaussian Pulses, BW 100 Hz	FS	all	1	0.025	0.975	10	10
60	-Pink Gaussian Pulses, BW 200 Hz	FS	all	1	0.0125	0.9875	10	10
61	-Pink Gaussian Pulses, BW 400 Hz	FS	all	1	0.00675	0.99325	10	10
62	PowerSweep 315-20 Hz *	-4	all	1	18.3	0	1	18.3
63	Warbled Power Sweep 315-20 Hz *	-4	all	1	18.3	0	1	18.3
64	Pink Noise 1/3 Oct sweep 315-20 Hz *	-12	all	1	18.3	0	1	18.3
65	Tone Bursts 315 Hz - 20 Hz	-3 (=FS)	all	1	1	4	13	65
66	Tone Bursts 315 Hz - 20 kHz	-3 (=FS)	all	1	0.5	2.5	19	57
67	Abs. Phase Checker	FS	all	1	0.2	0	300	60
Total net duration [minutes]								25.725